



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant(s): Steven Donders
Examiner: Jori Schiffman
Serial No: 10/030,799
Art Unit: 3679
Filed: January 11, 2002
Docket: 14971
For: METHOD FOR PRODUCING A
BALL-AND-SOCKET JOINT
BETWEEN A SLIPPER AND A
PISTON, AND A BALL-AND-
SOCKET JOINT OF THIS TYPE
Dated: January 27, 2004

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

DECLARATION OF STEVEN DONDEES UNDER 37 C.F.R. §1.132

Sir:

Steven Donders declares and says as follows:

1. I am the sole inventor of the subject matter of the above-identified U.S. patent application, and have complete knowledge of the invention and all technical aspects thereof, and embodiments disclosed therein.
2. The present invention, and various aspects thereof, is directed to a ball-and-socket joint forming a connection between a piston and a slipper of a piston machine and wherein through various metallurgical applications, there is obtained a superior ball-and-socket joint presenting considerable technological and physical advantages over the current state of the technology.

3. The Declarant has reviewed and analyzed the Office Action of October 30, 2003, noting that although various of the claims have already been allowed, the rejections of Claims 20 and 23, and remaining Claims 26-29 are predicated on the aspects that the construction of the joint is defined by a product-by-process claim. Accordingly, in response to the Office Action, and in support of the claims which are currently under rejection, I have been requested by counsel to provide additional data, which further supports the efficacy of the present invention and allowablilty of those particular claims.
4. Reverting to currently pending Claims 20 and 23, which have been rejected as being anticipated by Wagenseil, U.S. Patent No. 5,007,332, the latter of which is commonly assigned to the present assignee, the Declarant notes that each of these claims comprises the following feature:
- “c) free recess edge (7) of the joint recess (5) having been hot-beaded into a condition reducing the hardness of said joint recess for converging said free recess edge into a configuration which the other lateral surface thereof converging conically towards the free recess edge, confining said spherical joint ball within said joint recess”
5. The foregoing claims represent two (2) embodiments, concerning each of which Declarant notes:
- a) are based on an inventive step

b) and are visible and verifiable on the finished product (ball-and-socket joint) with regard to the individual features thereof and in particular feature c) supra.

6. The Declarant hereby notes that ball-and-socket joints produced with cold beading treatments are currently known in the state of the technology; for example, in accordance with the following U.S. Patents:

U.S. Patent No. 5,724,733 (at the recess edge of the piston);

U.S. Patent No. 6,318,241 B1 (at the recess edge of the piston); and

U.S. Patent No. 5,007,332 (at the recess edge of a slipper and at the recess edge of a piston).

7. Concerning the foregoing, Declarant states that:

It is known to the Declarant that during cold beading the beaded edge is pressed against the lateral surface of the ball and immediately after beading springs back to some specific degree a due to the elasticity in the material of the beaded edge. The extent of degree a depends on the properties of the material, referring to Fig. X of the attached drawing.

In contrast therewith, the invention is based on the realization of the fact that in the case of hot beading, the strength of the material is reduced in the area of the beading edge and that, therefore, the ductility of the beading edge is improved and moreover the spring-back degree b is smaller than in case of cold beading, referring to Fig. Y of the attached drawing. The reduced spring-back

degree b is beneficial for the desired freedom of gliding of the ball joint, which is required in order to provide for the movability of the joint, but which should not be excessive since too much freedom of movement would cause the joint to unduly noisily clatter.

It has to be ascertained that the reduced spring-back degree b after hot beading substantially corresponds to a desired freedom of movement of the joint.

The competent expert does not have any model for hot beading in the state of the art. Neither can the conception of hot beading be derived from the state of the art.

The aforementioned additional realization that hot beading, as explained above, is particularly suitable under consideration of a desired freedom of movement of the ball joint is based on thoughts and conclusions made by the competent expert that by far exceed his average skills. Independent Claims 20 and 23 are, therefore, based on an inventive step.

8. Additional inventive aspects can be ascertained as follows:

The aforementioned degrees a and b of spring-back during cold beading and hot beading are specific values that are dependent on the size of the beading edge and that each lie within a specific tolerance range.

For hot beading, this tolerance range is narrower than for cold beading, the explanation for such being the fact that the ductility of the material is improved in the case of hot beading and that the material has a reduced spring-back effect.

At any rate, the spring-back degree b in the case of hot beading stands in a specific ratio to the dimension of the beading edge, the material and the hot beading temperature which has an influence on the material structure. As a consequence, the hot beading is reproducible within the aforementioned tolerance range. The finished product can be used to verify whether the beading edge has been cold-beaded or hot-beaded by measuring the size of the hot-beaded beading edge, or respectively by detecting the spring-back degree b .

Starting from a specific material and a specific size of the beading edge, cold beading cannot be any means lead to such a small freedom of movement as can be achieved by way of hot beading, referring to degree b . Therefore, it is readily verifiable by means of measuring and with consideration of the kind of material employed whether a recess edge is cold-beaded or hot-beaded.

9. The foregoing data is deemed to clearly define the aspects that the invention can only be distinguished over the prior art by the advantageous treatment which of necessity can be specified by product-by-process claims.
10. Therefore, the foregoing comments and data presented herein conclusively illustrate that Claims 20, 23 and other dependent product-by-process claims are directed to clearly allowable and patentable subject matter distinguishing over the current state of the art in a manner within the scope of the U.S. claim drafting requirements.

11. The undersigned Declarant declares further that all statements made herein of his own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements and the like so made are punishable by fine or imprisonment or both, under Section 1001 Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application of the patent issuing thereon.

Dated: 23.01.2004


Steven Donders